

# Plug and Play

*Plug and Play (PnP) allows users to add new capabilities by inserting add-in cards without worrying about complicated system configuration issues. The combination of PnP system design and PnP add-in cards enables automatic configuration of these cards. With PnP, users can quickly adopt new technologies they would otherwise forgo due to the complexity of configuration.*

## TECHNOLOGY IMPLEMENTERS:

- Independent Hardware Vendors
- Independent Software Vendors
- Operating System Vendors
- Original Equipment Manufacturers

## USER BENEFITS:

- Automatic configuration of add-in cards and peripherals
- PCs are easier to expand
- Reduced user frustration
- Lower support costs
- Easy incorporation of the latest in PC enhancement



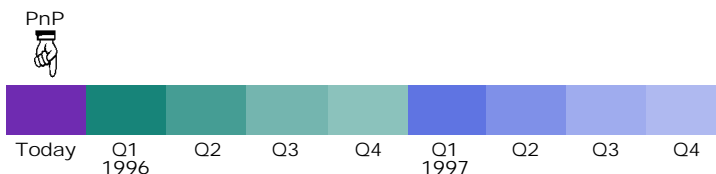
One of the strengths of the PC is the ability to extend the functionality of the system through the addition of PC add-in cards and peripherals. However, installing and configuring these options has been a difficult process. Users who add a traditional ISA (legacy) card for the first time typically expect to open the PC and insert the card. Instead, during installation, they are asked several technical questions and faced with the perplexing task of configuring the new card by selecting the IRQ, I/O ports and DMA channel. Users are required to move jumpers or set switches on the add-in cards. They need to know exactly what resources are already in use by the system, and are faced with finding a particular set of resources that do not conflict with the devices already in the system. Worse, the user has no way of knowing if a problem exists until the system is turned on.

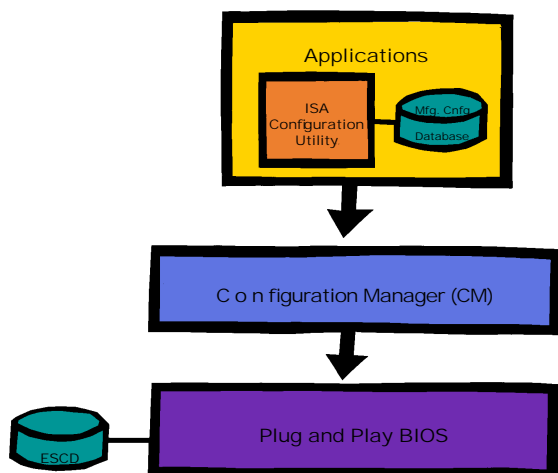
If there is a conflict, the system may not boot, the device may fail or cause the conflicting hardware to fail. As a result, the user must either call technical support and/or return the add-in card.

PnP is the technology designed to prevent configuration problems and provide users with the ability to easily expand the PC capability. In a PnP environment, the user simply plugs in the new card and the system configures for proper operation. Today, there are three types of PnP add-in cards: PCI (Peripheral Component Interconnect), PCMCIA (Personal Computer Memory Card International Association) and PnP ISA.

Currently there are over 250 independent hardware and software vendors supporting PnP. OEMs are providing systems that are PnP enabled and OS vendors are developing PnP aware operating systems.

## AVAILABILITY TIMELINE





### How Does PnP Work?

PnP is composed of four principal components: the Plug and Play BIOS, the extended System Configuration Data (ESCD), the Configuration Manager (CM) and the ISA Configuration Utility (ICU).

The figure shows how the four components work together. The PnP BIOS initiates the auto-configuration of the PnP cards during the boot up process. If the cards were previously installed, the BIOS reads the information from ESCD and initializes the cards, then boots the system. During the installation of new PnP cards, the BIOS consults the ESCD to determine what system resources are available and needed for the add-in card. If the BIOS is able to match the resources then it configures the card. However, if the BIOS is unable to match the resources, then during the system initializing the CM completes the auto-configuration process. In this process, it updates the configuration registers (in Flash BIOS) on the card and allows the BIOS to update the ESCD with the new configuration data. The CM is automatically loaded as a driver, when there is a

conflict with the configuration of the card and BIOS is unable to resolve this conflict.

The ISA Configuration Utility (ICU) is the final component of the complete PnP system. Its principal purpose is to assist users in determining a conflict-free configuration for standard ISA cards. Prior to the installation of the card, the user runs this utility for the recommended configurations. Based on the user selection, the ESCD is updated. The card is manually configured with that configuration and inserted into the system. The ICU is also used to resolve any conflicts that BIOS and CM could not handle.

### Making Use of Plug and Play Technology

PnP saves time and reduces installation/configuration costs to both the user and technical support. PnP systems can work with existing non-PnP add-in cards too. However, users should demand PnP ready systems and PnP ready add-in solutions. PnP configuration software kits are available for MS-DOS\* and Windows\* 3.1 operating systems. It is a built-in feature for Windows 95.

For information on Plug and Play technology, please access Intel's home page on the World Wide Web at:  
<http://www.intel.com>

For more specific information on Plug and Play, please refer to the following web sites:  
<http://www.intel.com/IAL/plugplay/plugplay.html>  
 or <http://www.microsoft.com/devonly/strategy/win32/pnpapp.htm>

Or for additional information on PnP, contact:

B.B.S: 1-503-264-7999  
 Voice: 1-800-433-3695

### TECHNOLOGY IMPLEMENTERS<sup>†</sup>:

- **Original Equipment Manufacturers**  
 AST, Compaq, Dell, Digital Equipment Corporation, IBM, Intel Corporation
- **Independent Hardware Vendors**  
 3Com, Creative Labs, Intel Corporation, Media Vision
- **Independent Software Vendors**  
 AMI, Award, Phoenix Technologies, SystemSoft
- **Operating System Vendors**  
 IBM, Microsoft, Novell, Santa Cruz Operation

<sup>†</sup>Partial list